AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated below.

1. (Currently Amended) A fluidized-bed reactor comprising:

a chamber defining a hollow interior region and having a lower surface;

a first input for introducing a contaminated gas into the hollow interior region;

a plurality of catalyst nanoparticles within the hollow interior region and located on the lower surface, wherein the catalyst nanoparticles have an average particle diameter of about 15 nm to about 25 nm, and

a fluidizing input for introducing a fluidizing material into the hollow interior region, said fluidizing input having an outlet directed at the lower surface of the chamber,

wherein the introduction of the fluidizing material directed at the lower surface fluidizes at least a portion of the catalyst nanoparticles located on the lower surface to create a gaseous dispersion of catalyst nanoparticles that reacts with the contaminated gas to produce a decontaminated gas.

2. (Original) The fluidized-bed reactor of claim 1 wherein the catalyst nanoparticles are partially fluidized by the introduction of the contaminated gas through the first input.

3 (Original) The fluidized-bed reactor of claim 1 further comprising a port for the exit of the decontaminated gas out of the hollow interior region.

4. (Original) The fluidized-bed reactor of claim 3 further comprising a second input for introducing a backpressure pulse of gaseous material into the hollow interior region through the port.

5. (Original) The fluidized-bed reactor of claim 4 further comprising a gas permeable separation device in communication with both the port and the second input, wherein the exit of decontaminated gas from the hollow interior region through the gas permeable separation device causes catalyst nanoparticles to collect upon the gas permeable separation device and the entrance of the backpressure pulse into the hollow interior region displaces collected catalyst nanoparticles.

6. (Original) The reactor of claim 1, further comprising a humidifier in communication with the first input.

7. (Currently Amended) The reactor of claim 4 further comprising a device for synchronizing the function of the second input for introducing a backpressure pulse of gaseous material into the hollow interior region to function with ~~introduction of at least~~ one of the group ~~comprised of backpressure pulse, contaminated gas and combinations thereof into the hollow interior~~comprising the first input for introducing a contaminated gas into the hollow interior region, the fluidizing input for introducing a fluidizing material into the hollow interior region and combinations thereof, wherein the device for synchronizing prevents the simultaneous introduction of at least one of the group comprising contaminated gas, fluidizing material, and combinations thereof with a backpressure pulse of gaseous material into the hollow interior region.

8. (Cancelled)

9. (Currently Amended) The reactor of claim 1, wherein the catalyst nanoparticles comprises one or more ~~a semi-conductive material~~ metals.

10. (Currently Amended) The reactor of claim ~~4~~9, wherein the ~~semi-conductive material~~ one or more metals is selected from the group comprising copper, ruthenium, osmium, platinum, silver, nickel, rhodium, palladium, gold, and/or combinations thereof.

11. (Original) The reactor of claim 1 further comprising an ultraviolet light.

12. (Original) The reactor of claim 11, wherein the ultraviolet light is positioned within the hollow interior region of the chamber.

13. (Original) The reactor of claim 11, wherein the ultraviolet light is positioned outside the chamber.

14. (Original) The reactor of claim 11, further comprising a humidifier in communication with the first input.

15. (Original) The reactor of claim 11, wherein the catalyst nanoparticles comprise a photocatalytic material comprising at least one material selected from the group comprised of titanium dioxide, aluminum oxide, vanadium pentoxide, iron (III) oxide, zinc oxide, cadium sulfide, zinc telluride, zirconium oxide, molybdenum disulfide, tin oxide, antimony tetraoxide, cesium dioxide, tungsten trioxide, niobium pentoxide, and combinations thereof.

16. (Currently Amended) The reactor of claim 11, wherein the catalyst nanoparticles comprise a metal oxide and at least one co-catalyst.

17. (Currently Amended) The reactor of claim 16, wherein the co-catalyst is comprises one or more metals selected from the group comprising copper, ruthenium, osmium, platinum, silver, nickel, rhodium, palladium, gold and mixtures thereof.

18. (Original) The reactor of claim 1, further comprising a means for agitating the catalyst nanoparticles within the hollow interior region.

19. (Original) The reactor of claim 18, wherein the means for agitating comprises a shaker device.

20. (Original) The reactor of claim 18 wherein the means for agitating comprises a vibrator.

21. (Currently Amended) A method of removing contaminants from a contaminated gas comprising:

providing a fluidized-bed reactor comprising:

a chamber defining a hollow interior region and having a lower surface;

a first input for introducing a contaminated gas into the hollow interior region;

a plurality of catalyst nanoparticles within the hollow interior region and located on the lower surface, wherein the catalyst nanoparticles have an average particle diameter of about 15 nm to about 25 nm, and

a fluidizing input for introducing a fluidizing material into the hollow interior region, said fluidizing input having an outlet directed at the lower surface of the chamber,

wherein the introduction of the fluidizing material directed at the lower surface fluidizes at least a portion of the catalyst nanoparticles located on the lower surface to create a gaseous dispersion of catalyst nanoparticles that reacts with the contaminated gas to produce a decontaminated gas

introducing the contaminated gas into the hollow interior region;

introducing the fluidizing material into the chamber and directing the fluidizing material at the lower surface to fluidize at least a portion of the catalyst nanoparticles located on the surface to create a gaseous dispersion of catalyst nanoparticles that react with the contaminated gas to produce a decontaminated gas.

22. (Original) The method of claim 21 wherein the fluidized-bed reactor further comprises

a port for the exit of the decontaminated gas out of the hollow interior region,

a second input for introducing a backpressure pulse of gaseous material into the hollow interior region through the port, and

a gas permeable separation device in communication with both the port and the second input.

23. (Currently Amended) The method of claim ~~B~~22 further comprising passing the decontaminated gas from the hollow interior region through the port and the separation device so that nanoparticles are collected on the separation device; and introducing a backpressure pulse into the hollow interior region through the port and separation device so as to displace catalyst nanoparticles from the separation device.

24. (Currently Amended) The method of claim 23, further comprising the step of synchronizing the function of the second input for introducing a backpressure pulse of gaseous material into the hollow interior region to function with ~~introduction of~~ at least one of a group comprising the first input for introducing a contaminated gas into the hollow interior region, the fluidizing input for introducing a fluidizing material into the hollow interior region and combinations thereof, wherein the device for synchronizing prevents the simultaneous introduction of at least one of the group comprising contaminated gas, fluidizing material, and combinations thereof with a backpressure pulse of gaseous material into the hollow interior region~~comprised of backpressure pulse, contaminated gas, fluidizing material and combinations thereof into the hollow interior~~.